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10/062,361	01/31/2002	Liang-Sheng L. Liao	83483RLO	2925

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EXAMINER

GARRETT, DAWN L

ART UNIT

PAPER NUMBER

1774

DATE MAILED: 07/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application N .

10/062,361

Applicant(s)

LIAO ET AL.

Examiner

Dawn Garrett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-16 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Objections*

1. Claim 1 is objected to because of the following informalities: Claim 1 sets forth components a), b), c), d) and f), but omits "e)". It is suggested "f)" be changed to "e)". Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 6, 12, 13, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuura et al. (US 5,516,577). Matsuura et al. discloses an organic electroluminescent device comprising anode/light emitting layer/adhesive layer/cathode (see abstract). The adhesive layer reads upon the instant "adhesion-promoting layer" and the light emitting layer reads upon the instant electroluminescent medium. The adhesive layer comprises compounds such as bis(benzo-8-quinolinol)zinc (see col. 17, lines 12-13) per instant claim 6. The thickness of the adhesive layer is 1-50 nm (see

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col. 17, lines 54-57) per instant claims 1 and 16. Preferred cathode material is magnesium (see col. 3, lines 11-12). The disclosure of a cathode layer comprising only magnesium is interpreted as 100% magnesium per instant claims 12 and 13. Matsuura et al. discloses all components of claims 1, 6, 12, 13, and 16.

4. Claims 1, 5, and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Namiki et al. (US 5,457,565). Namiki et al. discloses an organic electroluminescent device comprising an electron injecting layer of alkaline earth metal oxides disposed between the emitting layer and the cathode (see abstract). The electron-injecting layer comprises at least one of, for instance, SrO, CaO, or BaO (see col. 2, lines 54-57). The electron injection layer reads upon the instant "adhesion-promoting layer". The electron injection layer is from 1-10 angstroms (0.1 to 1 nm) in thickness (see col. 5, lines 34-36) per claims 1 and 16. Preferred cathode material includes magnesium and AgMg alloy (see col. 1, lines 46-48) per claims 1 and 12-14. The disclosure of a cathode layer comprising only magnesium is interpreted as 100% magnesium per instant claims 12 and 13. The emitting layer adjacent the electron injecting layer is comprised of Alq (see col. 3, lines 1-5) per the "electroluminescent medium" and instant claim 15. Namiki et al. discloses all components of claims 1, 5, and 12-16.

5. Claims 1, 2, 4, and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Wakimoto et al. (US 5,739,635). Wakimoto et al. discloses an organic electroluminescent device comprising an electron injecting layer of alkaline metals and oxides disposed between the emitting layer and the cathode (see abstract). The electron-injecting layer comprises at least one material including Rb, Cs, Rb<sub>2</sub>O or Cs<sub>2</sub>O

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(see col. 2, lines 54-57 and abstract). The electron injection layer reads upon the instant "adhesion-promoting layer". The electron injection layer is 500 angstroms or less (50 nm or less) in thickness and examples describe the thickness from 1 to 22 angstroms (see col. 3, lines 14-15 and Table 2, col. 4) per instant claims 1 and 16. Preferred cathode material includes magnesium and AgMg alloy (see col. 3, lines 17-23) per claims 1 and 12-14. The disclosure of a cathode layer comprising only magnesium is interpreted as 100% magnesium per instant claims 12 and 13. The emitting layer adjacent the electron injecting layer is comprised of Alq (see col. 3, lines 28-35) per the "electroluminescent medium" and instant claim 15. Wakimoto et al. discloses all components of claims 1, 2, 4, and 12-16.

6. Claims 1-6 and 9-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakamura et al. (US 6,509,109). Nakamura et al. discloses an organic electroluminescent device comprising an anode, cathode, electron injection region (per the instant "adhesion-promoting layer") and electroluminescent medium comprising light emission and hole injecting and transporting layers (see Figures 1, 2, 4, and 5).

Nakamura et al. discloses the electron injection region of the first embodiment that is adjacent to the cathode contains a reducing dopant comprising alkali metals, alkaline earth metals, rare earth metals, alkali metal oxides, alkali metal halides, alkaline earth oxides, alkaline earth halides, and rare earth metal oxides (see col. 7, lines 29-34) per the "adhesion-promoting layer" of instant claims 2-5 and 9-11. Preferred alkaline earth metals include Ca, Sr, and Ba per instant claims 3 and 5 (see col. 7, lines 44-50 and 58-59). Preferred alkali metals include K, Rb and Cs (see col. 7, lines 35-43) per instant

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claims 2 and 4. Preferred rare earth metals include Yb and Eu (see col. 7, lines 51-55) per instant claims 10 and 11. Per instant claim 6, the electron injection layer comprises a zinc compound tris(8-quinolinol) Zn complex (see col. 13, line 1). The thickness of the electron injection region is between 0.1 nanometers to 1 micrometer (see col. 9, lines 38-41) per instant claim 1 (d) and claim 16. In an additional embodiment, alkaline earth compounds such as BaO and SrO are used as an interlayer, which is between the cathode and the electron injection layer (see col. 17, lines 32-40 and Figure 6) per the "adhesion promoting layer". The interlayer thickness is 0.1 nm to 10 micrometers (see col. 17, lines 43-45) and is adjacent an electron injection layer comprising Alq (see col. 20, lines 32-34 and col. 12, lines 30-63) per instant claim 15. Preferred cathode layer material includes magnesium and silver either singly used or in combination per instant claims 1(f) and 12-14. The disclosure by Nakamura et al. of cathode layer singly comprising magnesium is understood to be 100% magnesium per instant claims 12 and 13. Nakamura et al. discloses all required components of instant claims 1-6 and 9-16.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 6, 9, 10, and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. (US 6,013,384). Kido et al. discloses organic electroluminescent devices comprising a metal doped layer between a cathode

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electrode and a luminescent layer (see front page drawing and abstract). The luminescent layer and hole transportation layer read upon the instant electroluminescent medium. The metal-doped layer dopant metal includes K, Ca, Sr, Ba, Y, La, Sm, Gd, and Yb (see col. 4, lines 8-15). The luminescent layer includes Alq per instant claim 15 (see col. 8, lines 24-47). Kido et al. teaches aluminum is the preferred cathode material (see col. 2, lines 33-39) and fails to teach an embodiment where a cathode comprising substantially Mg or MgAg is used. Kido et al. does teach in the background art, however, that magnesium and co-deposited magnesium and silver are known materials for making a cathode for an electroluminescent device (see col. 1, lines 28-40). It would have been obvious to one of ordinary skill in the art to have formed a cathode from magnesium or a magnesium/silver alloy to obtain an efficient device, because Kido et al. teaches it is known in the art to use Mg or MgAg in a cathode to achieve a highly efficient EL device.

***Allowable Subject Matter***

9. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest prior art is considered to be Matsuura (US 5,516,577) and Nakamura (US 6,509,109), which teach zinc containing compounds adjacent a cathode and Kido (US 6,013,384), which teaches yttrium in a layer adjacent a cathode. These references fail to teach one of the transition metals or metal oxides recited in claims 7 and 8 as an adhesion promoting layer adjacent a

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magnesium cathode and an electroluminescent medium in an EL device as recited in claim 1.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703) 305-0788. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached at (703) 308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.

  
DAWN L. GARRETT  
PATENT EXAMINER  
TECHNOLOGY CENTER 1700

D.G.  
June 25, 2003